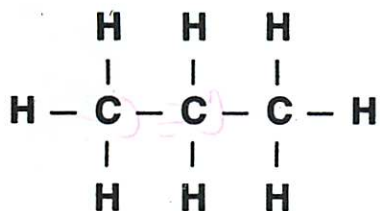


NAMING HYDROCARBONS

Name _____

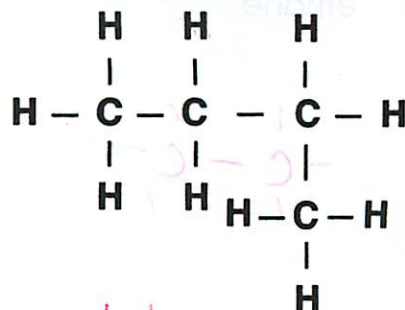
Name the compounds below according to the IUPAC naming system

1.



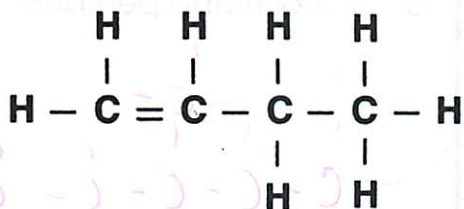
n-propane

5.



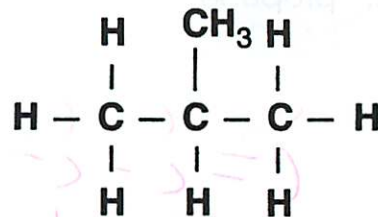
n-butane

2.



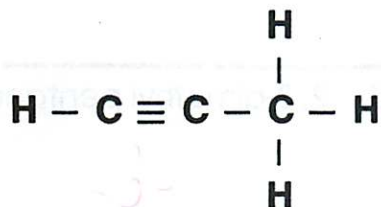
n-butene

6.



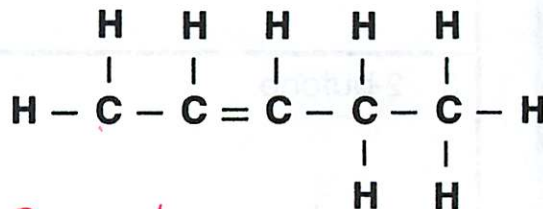
2-methyl propane

3.



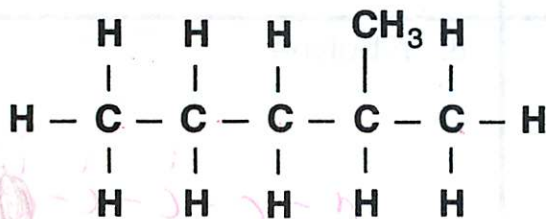
n-propyne

7.



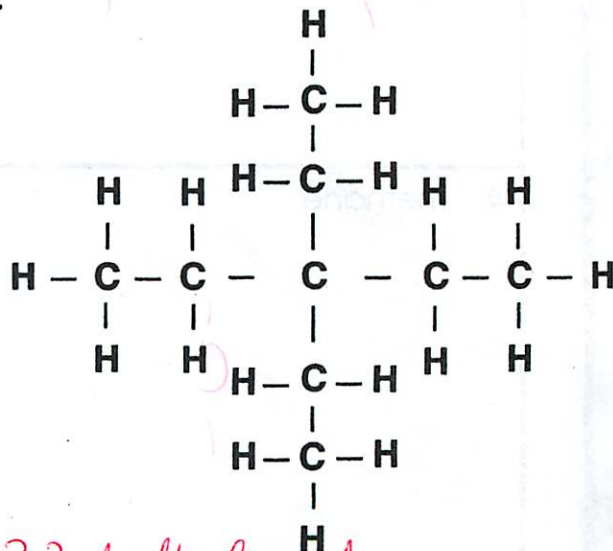
cis 2-pentene

4.



2-methyl pentane

8.



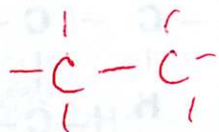
3,3-diethyl pentane

STRUCTURE OF HYDROCARBONS

Name _____

Draw the structure of the compounds below.

1. ethane



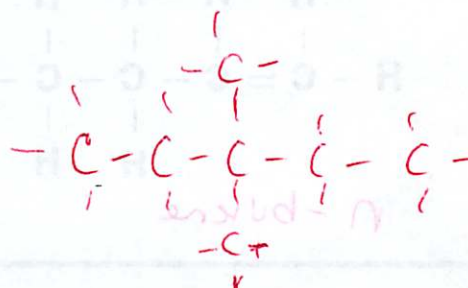
5. ethyne



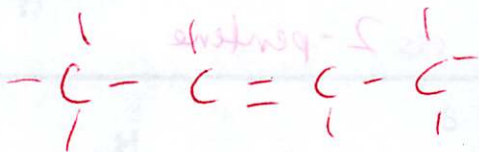
2. propene



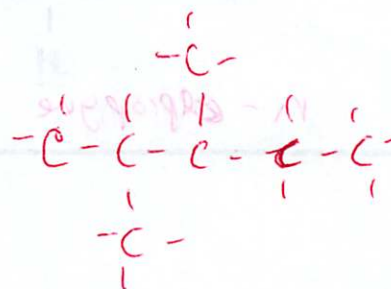
6. 3,3-dimethyl pentane



3. 2-butene



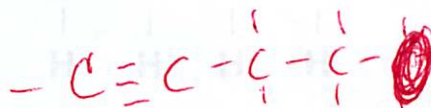
7. 2,3-dimethyl pentane



4. methane



8. n-butyne



FUNCTIONAL GROUPS

Name _____

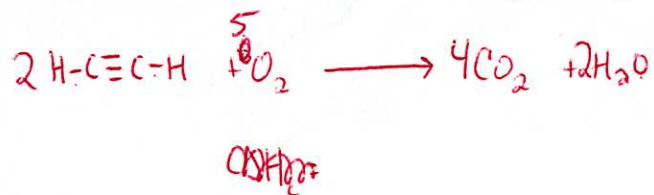
Classify each of the organic compounds below as an alcohol, carboxylic acid, aldehyde, ketone, ether or ester, and draw its structural formula. Name this compound too

<p>1. CH_3COOH Carboxylic acid</p> <p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---C---OH} \\ \quad \end{array}$ acetic acid ethanoic </p>	<p>6. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$</p> <p> $\begin{array}{c} \text{---C---C---C---} \\ \quad \quad \\ \quad \text{OH} \quad \end{array}$ 2-propanol </p>
<p>2. CH_3COCH_3 Ketone</p> <p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---C---C---} \\ \quad \quad \end{array}$ propanone </p>	<p>7. $\text{CH}_3\text{CH}_2\text{COOH}$</p> <p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---C---C---OH} \\ \quad \quad \end{array}$ propanoic acid </p>
<p>3. $\text{CH}_3\text{CH}_2\text{OH}$ alcohol</p> <p> $\begin{array}{c} \text{---C---C---OH} \\ \quad \end{array}$ ethanol </p>	<p>8. $\text{CH}_3\text{CH}_2\text{COOCH}_3$</p> <p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---C---C---O---C---} \\ \quad \quad \quad \end{array}$ methyl propanoate </p>
<p>4. $\text{CH}_3\text{CH}_2\text{OCH}_3$</p> <p> $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H---C---C---O---C---H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ ethoxyethane methoxy ethane ethyl methyl ether </p>	<p>9. $\text{CH}_3\text{CH}_2\text{COCH}_3$</p> <p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---C---C---C---} \\ \quad \quad \quad \end{array}$ 2-butanone </p>
<p>5. $\text{CH}_3\text{CH}_2\text{CHO}$</p> <p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---C---C---} \\ \quad \quad \end{array}$ propanal </p>	<p>10. CH_3OCH_3</p> <p> $\begin{array}{c} \text{---C---O---C---} \\ \quad \end{array}$ methoxy methane dimethyl ether </p>

Structure	Functional Group, or "alkane, alkene, alkyne"	Number C's used to determine prefix	Name	Formula
$ \begin{array}{cccccccc} H & H & H & H & H & H & H & H \\ & & & & & & & \\ H-C & -C & -C & -C & -C & -C & -C & -C-H \\ & & & & & & & \\ H & H & H & H & H & H & H & H \end{array} $	Alkane	8	Octane	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3$ C_8H_{18}
$ \begin{array}{cccccc} H & H & H & H & H \\ & & & & \\ H-C & -C & -C & -C & -C-H \\ & & & & \\ H & H & H & OH & H \end{array} $	hydroxyl	5	2-pentanol	$CH_3CH_2CH_2CH(OH)CH_3$
$ \begin{array}{cccccc} H & H & H & H & H & O \\ & & & & & \\ H-C & -C & -C & -C & -C & -CH \\ & & & & & \\ H & H & H & H & H & \end{array} $	Aldehyde	6	hexanal	$CH_3CH_2CH_2CH_2CH_2CHO$
$ \begin{array}{cccc} H & H & H & O \\ & & & \\ H-C & -C & -C & -C-OH \\ & & & \\ H & H & H & \end{array} $	Carboxyl	4	butanoic acid	$CH_3CH_2CH_2COOH$
$ \begin{array}{ccccccc} H & H & & H & H & H & H \\ & & & & & & \\ H-C & -C & =C & -C & -C & -C & -C-H \\ & & & & & & \\ H & H & & H & H & H & H \end{array} $	alkene	7	3-heptene	$CH_3CH_2CH=CHCH_2CH_2CH_3$

Structure	Functional Group, or "alkane, alkene, alkyne"	Number C's used to determine prefix	Name	Formula
$\text{H}-\text{C}\equiv\text{C}-\text{H}$	alkyne	2	ethyne	HCCH
	Ester	Made from 1-hexanol and methanoic acid	hexyl methanoate	$\text{CH}_3\text{O}-\text{C}(=\text{O})\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
	Ketone	4	2-butanone	$\text{H}_3\text{CCOCH}_2\text{CH}_3$
	alkane	9	3,3-dichlorononane	$\text{CH}_3\text{CH}_2\text{CCl}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

Calculate the heat of combustion of ethyne using bond energies:



$$\begin{aligned}
 \Delta H_c &= (4(\text{C}-\text{H}) + 2(\text{C}\equiv\text{C}) + 5(\text{O}=\text{O})) - (8(\text{C}=\text{O}) + 4(\text{H}-\text{O})) \\
 &= (4(413\text{kJ}) + 2(839\text{kJ}) + 5(495\text{kJ})) - (8(799\text{kJ}) + 4(467\text{kJ})) \\
 &= (1615\text{kJ} + 1678\text{kJ} + 2475\text{kJ}) - (6352\text{kJ} + 1868\text{kJ}) \\
 &= 5768\text{kJ} - 8220\text{kJ} \\
 &= \boxed{-2452\text{kJ}}
 \end{aligned}$$